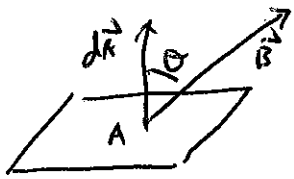
MONDAY 3/23/09

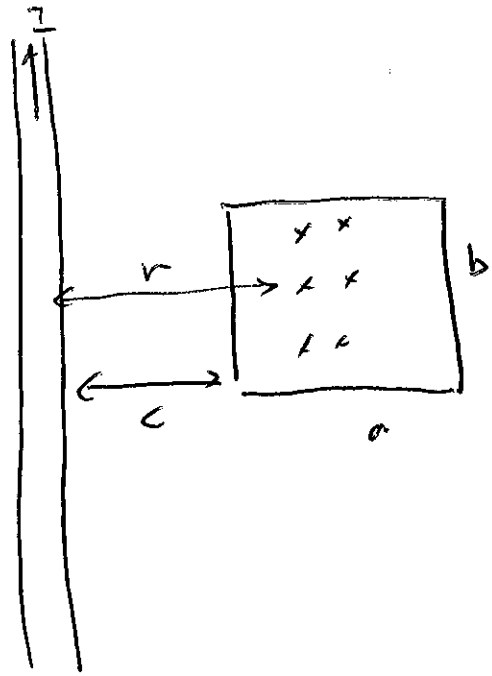
MAGNETIC FLUX

$$\Phi_B = \int \vec{B} \cdot d\vec{A}$$

$$\Phi = B\, dA \cos\theta$$



EXAMPLE



AMPERE'S LAW

$$2\pi r B = \mu_0 I$$

$$B = \frac{\mu_0 I}{2\pi r}$$

$$\Phi_B = \int_c^{a+c} \frac{\mu_0 I b}{2\pi r}$$

$$= \frac{\mu_0 I b}{2\pi} \ln r \Big]_c^{a+c}$$

$$= \frac{\mu_0 I b}{2\pi} \ln\left[1 + \frac{a}{c}\right]$$

$$\int \vec{E} \cdot d\vec{A} = \frac{q_{\text{ENCLOSED}}}{\epsilon_0}$$ GAUSS'S LAW

$$\int \vec{B} \cdot d\vec{A} = ?$$ ~~[illegible]~~ $\frac{q_{\text{ENCLOSED}}}{\epsilon_0}$ NO MONOPOLE

0

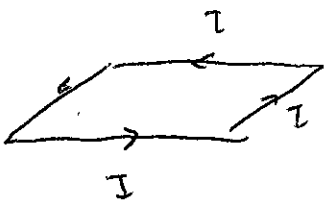
$$\boxed{\int \vec{B} \cdot d\vec{A} = 0}$$ GAUSS'S LAW FOR MAGNETIC FIELD

~~MAGNETIC MATERIALS~~

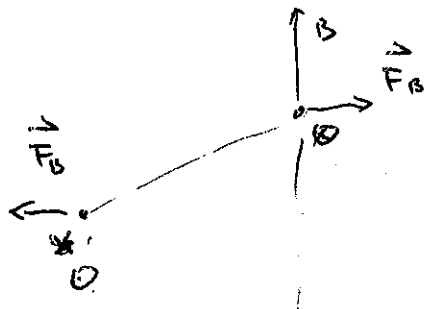
~~PARAMAGNETIC MATERIALS~~

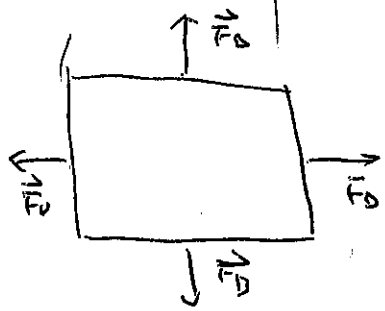
~~DIAMAGNETIC MATERIALS~~

~~FERROMAGNETIC MATERIALS~~



FORCES ? TORQUE





NET TORQUE.

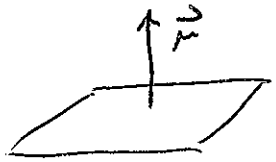
Book. IF YOU SEE IT.

SECTION 29.5.

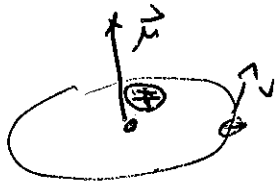
$\vec{\mu} = I\vec{A}$; MAGNETIC DIPOLE MOMENT

$\vec{\tau} = \vec{\mu} \times \vec{B}$

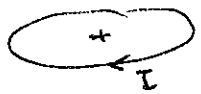
$= \mu B \sin\theta$



1 EXAMPLE



ev



$$I = \frac{e}{T} \qquad T = \frac{2\pi r}{v}$$

$$\mu = I r^2 \pi = \frac{e v}{2\pi r} \pi r^2$$

$$= \frac{e v r}{2}$$

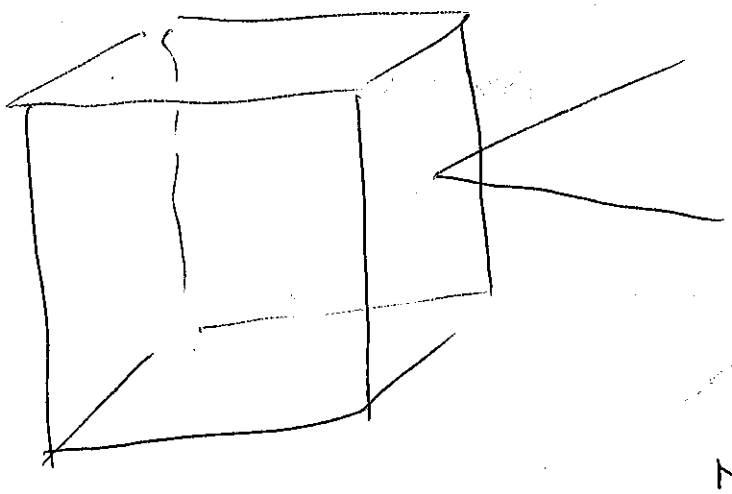
ANGULAR MOMENTUM OF ELECTRON

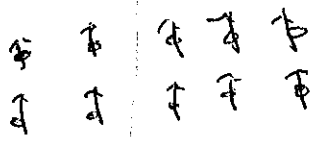
$$L = mvr$$

$$\mu_B = \frac{e}{2mc} L$$

$$\vec{L} = \hbar$$

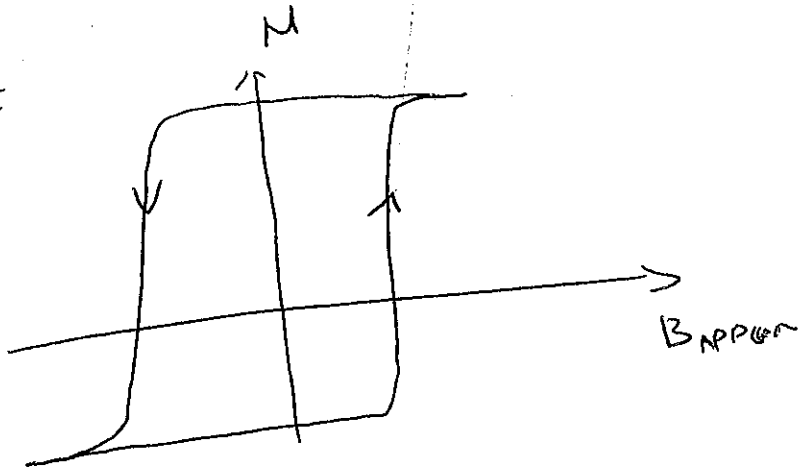
$$\mu_0 = \frac{e\hbar}{2mc}$$ BOHR MAGNETON





$M = \frac{\vec{\mu}_{\text{TOTAL}}}{V}$

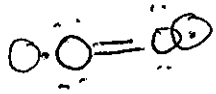
FERROMAGNET



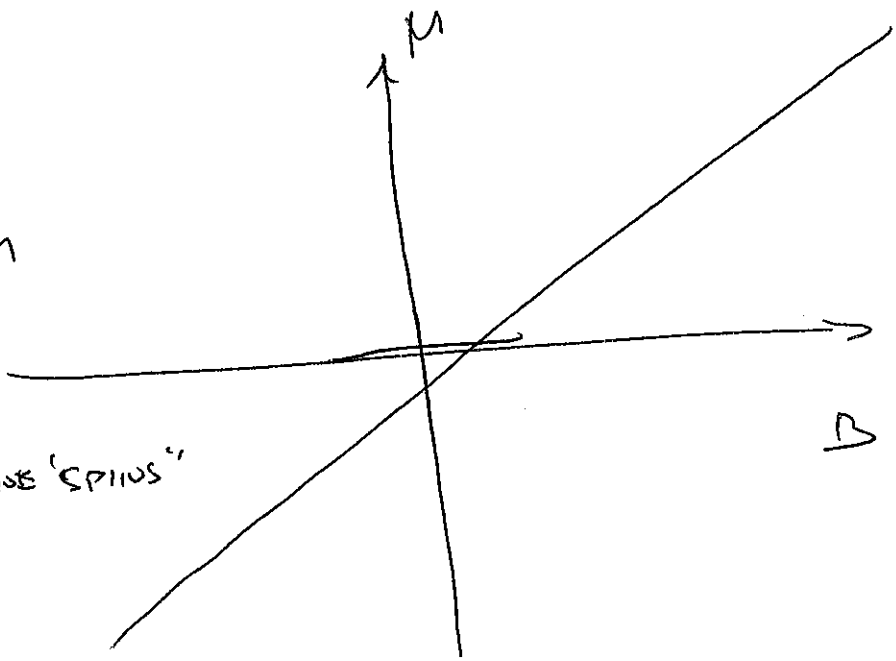
PARAMAGNET

ALUMINUM, PLATINUM

OXYGEN GAS



LONE "SPINS"



DIA MAGNET

GRAPHITE